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ABSTRACT

Project MER (Marine Ecology Research) is aimed at improving environmental education in the San Francisco Bay Area schools. As part of meeting this goal, it is hoped that students and teachers can see the results of their efforts being put to practical use. This guide is the sixth of a series produced to help students and teachers gather data concerning the San Francisco Bay-Delta-Estuary Complex and to organize these data to make a contribution to the literature of science, serving as the groundwork upon which knowledgeable decisions about the environment could be based. Presented in this guide is a key to aid in identifying the common fish of the Bay. Physical descriptions and illustrations of the fish are also given. Related documents are SE 016 645--SE 016 649. (JP)

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PROJECT M E R

MARINE ECOLOGY RESEARCH

HANDBOOK OF TECHNIQUES
and
GUIDES FOR THE STUDY
of the
SAN FRANCISCO BAY-DELTA-ESTUARY COMPLEX

KEY TO THE COMMON FISHES OF SAN FRANCISCO BAY

PART VI

Prepared by

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Berkeley High School

SE016 650

Contra Costa County Schools Office
Floyd Marchus, Superintendent

Alameda County Schools Office
Rock LaFleche, Superintendent

July, 1973

The HANDBOOK OF TECHNIQUES AND GUIDES FOR THE STUDY OF THE SAN FRANCISCO BAY-DELTA-ESTUARY COMPLEX was developed and prepared by the staff of the Contra Costa County Superintendent of Schools Office and teachers in Contra Costa and Alameda counties. It is reproduced through the facilities of the Alameda County Superintendent of Schools Office.

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COVER

Crago franciscorum, the Bay Shrimp, was once the most prevalent shrimp in San Francisco Bay. Today, as the result of changes in Bay waters, it is no longer commercially important.

The line drawing of *Crago f.* was prepared by Margaret Lynn Siri, student of Ed Springer, at Kennedy High School.

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PROJECT M E R

KEY TO THE COMMON FISHES OF SAN FRANCISCO BAY

Prepared by
Bob Sikora, Berkeley High School

1. Skin like sandpaper; more than one gill slit (on each side). . . . 2
1. Skin slippery; one gill slit 11

2. Body long and thin . . . . . Sharks, 3
2. Body flat and wide . . . . . Rays, 6

3. Anal fin absent. . . . . Dogfish
3. Anal fin present 4

4. Sides with blackish spots. . . . . Leopard Shark
4. Sides without marks. 5

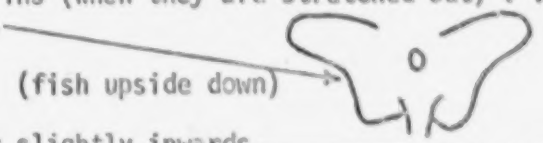
5. Anal fin same size as second dorsal and right below it . Soupfin Shark
5. Anal fin smaller than second dorsal and a little behind it. . . . . Brown Smoothound

6. One dorsal fin with stinger behind it. . . . . Bat Stingray
6. Two dorsal fins; no stinger. 7

7. Body round, smooth, with no prickles . . . . . Electric Ray
7. Skin rough with scattered prickles 8

8. Tail fin well developed . . . . . Thornback Skates
8. Tail fin very small or absent 9

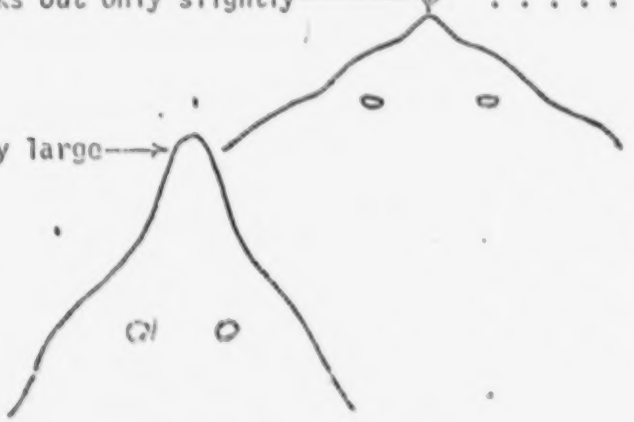
9. Outer edge of pelvic fins (when they are stretched out) 10
curve deeply inwards



(fish upside down)

9. Outer edge curves only slightly inwards . . . . Big Skate

10. Nose sticks out only slightly . . . . . California Skate



10. Nose very large . . . . . Longnose Skate

11. Pelvic fins present (look carefully, they may be small and hidden underneath). 12
11. Pelvic fins absent 46

12. Pelvic fins between pectoral fins and tail 13
12. Pelvic fins and pectorals overlapping. 22

13. 5 rows of bony plates on back; mouth under head. . . . White Sturgeon
13. No bony plates; mouth at front of head 14

14. No lateral line or small fleshy fin in front of tail and behind dorsal fin 15
14. With lateral line and/or small fleshy fin between dorsal and tail. 18

15. Mouth large; lower jaw not reaching to front of head . . . . .Anchovy
15. Mouth not especially large; lower jaw reaches to front of head 16

16. Rows of shaded spots on upper sides of body behind gills; two large scales on each side of tail 17
16. No dark spots or enlarged scales . . . . . .Herring

17. Lowest scales on belly forming a sharp, knifelike edge . . . . . Shad
17. No sharp edge on belly . . . . . Pilchard (Sardine)

18. Fleshy appendage at base of each pelvic fin; small fleshy fin between dorsal fin and tail 19
18. No appendage or small fleshy fin 23

19. Fleshy appendage at base of each pelvic fin. 20
19. No fleshy appendage at base of each pelvic fin . . . . . Surf Smelt

20. 8 - 12 rays in anal fin. . . . . .Steelhead Trout
20. 13 - 19 rays in anal fin . . . . . Salmon, 21

21. Black spots on upper lobe of tail only, jaws around teeth silvery; if small, dark marks on sides narrower (front to back) than the lighter spaces between them. . . . . Silver Salmon
21. Black spots on both lobes of tail, jaws, black around bases of teeth; if small, dark marks on sides wider (front to back) than the lighter spaces separating them. . . . . .King Salmon

22. Back of first dorsal fin ahead of anus; front of anal fin; pectoral fins do not reach back as far as base of pelvic fins) . . . . . .Jacksmelt
22. Back of first dorsal fin right above anus, just in front of anal fin; pectoral fins reach as far back as front of pelvics . . . . . Topsmelt

23. Body flat, like a pancake; both eyes on same side of head; darker on top side, lighter on bottom 24
23. Body the same on right and left sides. 31

24. Left (dark) pelvic fin on edge of throat; right (light) pelvic fin on right (blind) side. . . . . Speckled Sanddab
24. One pelvic fin on each side of body (right side of body up except in Starry Flounder which may be either way up). . . . 25

25. Mouth nearly the same on dark and light side; back end of jaw as far back as pupil of eye or farther on top side. 26
25. Mouth opens wider on bottom side; back end of jaw not as far back as pupil of eye on top side. 27

26. Dorsal and anal fins pointed in center Pacific Halibut
26. Dorsal and anal fins rounded . . . . . .Petrale Sole

27. Scales in form of bumps separated by tough skin. . . .Curlfin Turbot
27. Scales overlapping in usual fashion. 28

28. Lateral line single. . . . . Starry Flounder
28. Lateral line branched, one branch passing just beneath dorsal fin, the other branch passing over pectoral fins to tail. 29

29. Lower lateral line makes steep curve above pectoral fin. . Rock Sole
29. Lower lateral line nearly straight 30

30. Upper branch of lateral line does not extend beyond pectoral fin. . . . . .English Sole
30. Upper branch of lateral line extends well beyond pelvic fin. . . . . .Diamond Turbot

31. Row of scales beneath dorsal fin separated by groove from scales on rest of body . . . . . Sea Perches, 32
31. No row of scales with groove along base of dorsal. 40

32. Color pattern in head-to-tail stripes or up-and-down bars. . . . 33
32. Color otherwise. 37

33. Main color pattern up-and-down bars. 34
33. Main pattern of blue and orange head-to-tail stripes 36

34. Bars on sides green or brownish . . . . . .Barred Surfperch
34. Bars orange or yellowish 35

35. Adult less than 7 inches long; 3 bars on sides . . .Shiner Surfperch
35. Adult larger; about 9 or 10 bars on sides; reddish pelvic and tail fins. . . . . Redtail Surfperch

36. Front part of dorsal much shorter than back part . Striped Surfperch
36. Front part of dorsal fin only slightly lower than back part; dark bars on back; plus around eyes . . . . Rainbow Surfperch

37. Eye larger than mouth. . . . . Walleye Surfperch
37. Eye same size as mouth or smaller. 38

38. Lips thick and white or pinkish; fins dark except for light pectorals. . . . . Rubberlip Surfperch
38. Lips smaller. 39

39. Body shaded with dark color; black spot at corner of mouth; dorsal fin rises to point in middle . . . . . .Pileperch
39. Body light colored and shiny; no spot at corner of mouth; dorsal evenly rounded . . . . . .White Surfperch

40. 3 stiff, stout spines at front of anal fin, then 5 - 9 softer rays. A large group, many of whose species look alike and can be told apart only by experts. . . . Rockfishes, genus *Sebastes*
40. Anal fin with 0 - 4 spines, but if 3, not large or stout; spines followed by more than 10 softer rays. 41

41. Rows of small bright, shiny spots, looking like silvery pinheads, on body. . . . . Midshipman
41. Without spots 42

42. Tadpole-shaped, with a sucker under its flattened head. . .Clingfish
42. Not so shaped or, if so, no sucker. 43

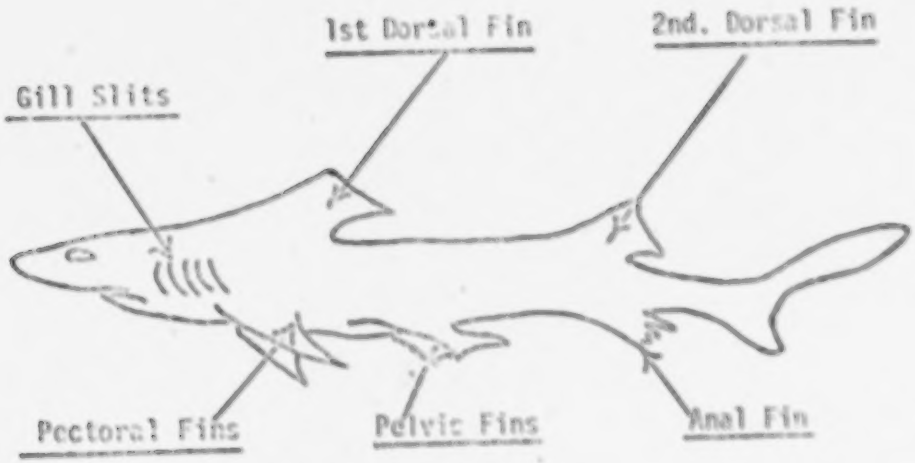
43. Pelvic fins united to form a cone; found in muddy areas, living in burrows of other animals . . . . . Arrow Goby
43. Pelvic fins not united. 44

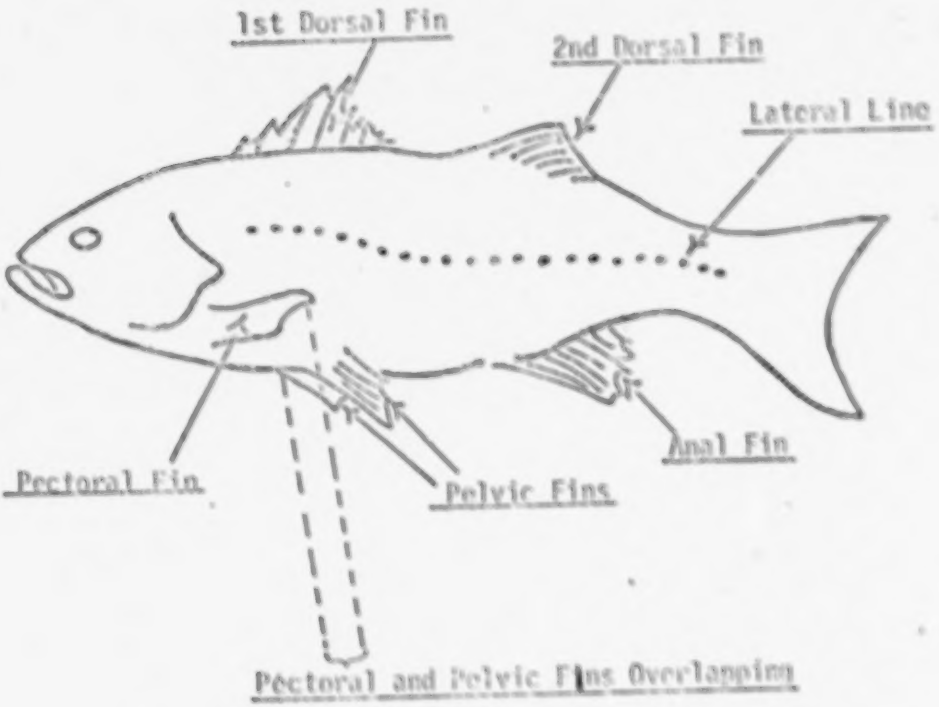
44. Two dorsal fins, the first composed of only 2 or 3 long, stout spines . . . . . .Threespined Stickleback
44. If two dorsal fins, the first not composed of 2 or 3 long, stout spines 45

45. Head with spines or prickles, at least on gill covers; scales not covering body below lateral line; pectoral fins large. The Sculpins, family Cottidae. A large family with many species that can be told apart only by experts. The most common species in the Bay is the Staghorn Sculpin which has a 3 or 4-pointed, antler-like spine on each gill cover. . . . . Family Cottidae
45. Head without spines; lower jaw sticking out beyond upper; 7 or 8 stripes running from head to tail; pectoral fins not large . . . . . Striped Bass

46. Body long and skinny, covered with bony plates; snout long and tubular; no more than 3/4 inch thick. . . . . Pipefish
46. Without bony plates or tubular snout; anal, tail and dorsal fins nearly continuous like one long fin going all the way around. 47

47. With large, strong teeth including flat crushing molars in back of mouth; long, coming to a pointed tail; covered with black spots. . . . . .Wolf-eel
47. With smaller mouth; teeth tiny . . . . . One of the Prickleback or Blenny Eels


1st Dorsal Fin
2nd. Dorsal Fin
Gill Slits
Pectoral Fins
Pelvic Fins
Anal Fin


1st Dorsal Fin
2nd Dorsal Fin
Lateral Line
Anal Fin
Pectoral Fin
Pelvic Fins
Pectoral and Pelvic Fins Overlapping

GLOSSARY OF SCIENTIFIC NAMES

Anchovy	(Fig. 1)	*Engraulis mordax*
Bass, Striped	(Fig. 2)	*Roccus saxatilis*
Clingfish	(Fig. 3)	*Gobiesox macandricus*
Dogfish, Spiny	(Fig. 4)	*Squalus acanthias*
Flounder, Starry	(Fig. 5)	*Platichthys stellatus*
Goby, Arrow	(Fig. 6)	*Clevelandia ios*
Halibut, Pacific	(Fig. 7)	*Hippoglossus stenolepis*
Herring, Pacific	(Fig. 8)	*Clupea harengus*
Jacksmelt	(Fig. 9)	*Atherinopsis californiensis*
Midshipman	(Fig. 10)	*Porichthys notatus*
Pilchard (Pacific Sardine)	(Fig. 11)	*Sardinops sagax*
Pileperch	(Fig. 12)	*Rhacochilus vacca*
Pipefish	(Fig. 13)	*Syngnathus leptorhynchus* (1)
Ray, Electric	(Fig. 14)	*Torpedo californica*
Salmon, King	(Fig. 15)	*Oncorhynchus tshawytscha*
Salmon, Silver	(Fig. 16)	*Oncorhynchus kisutch*
Sanddab, Speckled	(Fig. 17)	*Citharichthys stigmaeus*
Shad	(Fig. 18)	*Alosa sapidissima*
Shark, Leopard	(Fig. 19)	*Triakis semifasciata*
Shark, Soupfin	(Fig. 20)	*Galeorhinus zyopterus*
Skate, Big	(Fig. 21)	*Raja binoculata*
Skate, California	(Fig. 22)	*Raja inornata*

(1) *Syngathus leptorhynchus* has been more commonly known as *Syngathus griseolineatus*. In Fish and Game Bulletin #157, Guide to the Coastal Marine Fishes of California, the name *Syngathus leptorhynchus* is indicated, based on communications received by the authors from W. I. Follett, since *Syngathus leptorhynchus* appeared first in print. (Pg. 212, Prof: Pg. 39, Footnote 2.)

Skate, Longnose. . . . . (Fig. 23). . *Raja rhina*

Skate, Thornback . . . . . (Fig. 24). . *Platyrhinoidis triseriata*

Smelt, Surf. . . . . (Fig. 25). . *Hypomesus pretiosus*

Smoothound, Brown. . . . . (Fig. 26). . *Mustelus henlei*

Sole, English. . . . . (Fig. 27). . *Parophrys vetulus*

Sole, Petrale. . . . . (Fig. 28). . *Eopsetta jordani*

Sole, Rock . . . . . (Fig. 29). . *Lepidopsetta bilineata*

Stickleback, Three-spined. . . . . (Fig. 30). . *Gasterosteus aculeatus*

Stingray, Bat. . . . . (Fig. 31). . *Myliobatis californica*

Sturgeon, White. . . . . (Fig. 32). . *Acipenser transmontanus*

Surfperch, Barred. . . . . (Fig. 33). . *Amphistichus argenteus*

Surfperch, Rainbow . . . . . (Fig. 34). . *Hypsurus caryi*

Surfperch, Redtail . . . . . (Fig. 35). . *Amphistichus rhodoterus*

Surfperch, Rubberlip . . . . . (Fig. 36). . *Rhacochilus toxotes*

Surfperch, Shiner. . . . . (Fig. 37). . *Cymatogaster aggregata*

Surfperch, Striped . . . . . (Fig. 38). . *Embiotoca lateralis*

Surfperch, Walleye . . . . . (Fig. 39). . *Hyperprosopon argenteum*

Surfperch, White . . . . . (Fig. 40). . *Phanerodon furcatus*

Topsmelt . . . . . (Fig. 41). . *Atherinops affinis*

Trout, Steelhead (or Rainbow). . . . . (Fig. 42). . *Salmo gairdnerii*

Turbot, Curlfin. . . . . (Fig. 43). . *Pleuronichthys decurrens*

Turbot, Diamond. . . . . (Fig. 44). . *Hypsopsetta guttulata*

Wolf-eel . . . . . (Fig. 45). . *Anarrhichthys ocellatus*

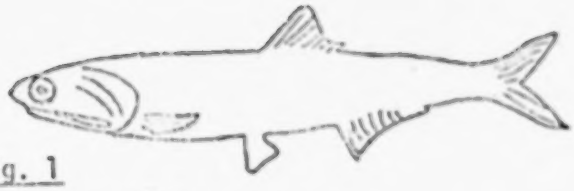


Fig. 1

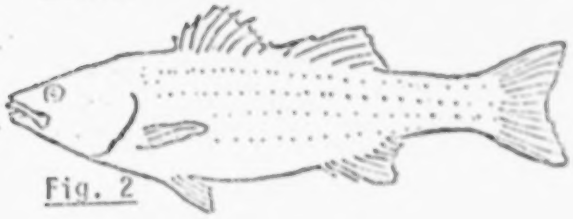


Fig. 2

Fig. 3

Fig. 4

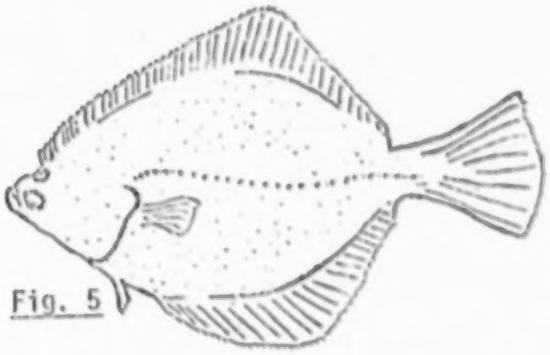


Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 10

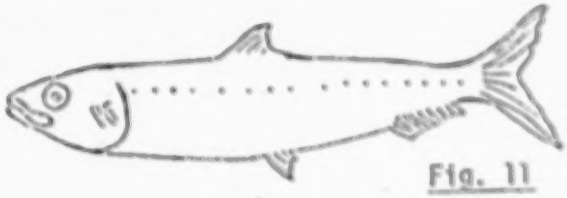


Fig. 11

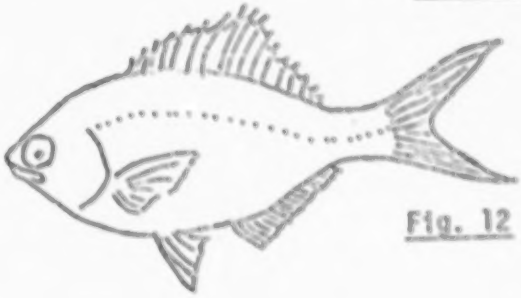


Fig. 12

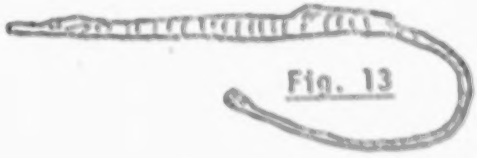


Fig. 13

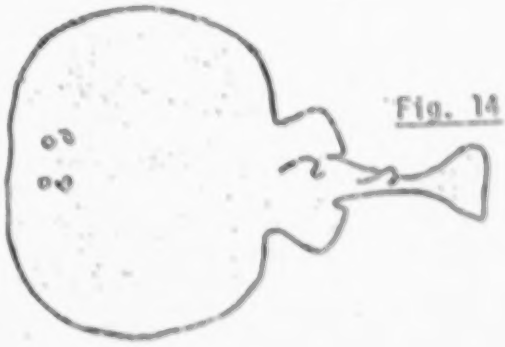


Fig. 14

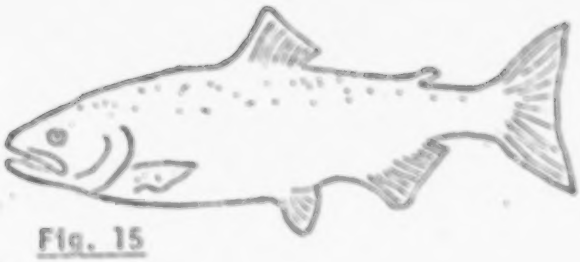


Fig. 15

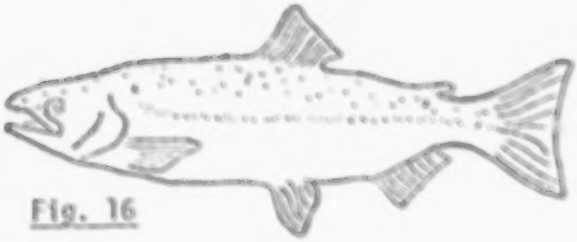


Fig. 16

Fig. 17

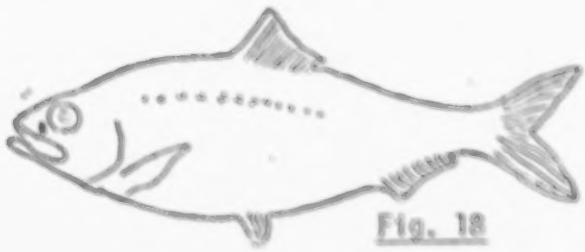


Fig. 18

Fig. 19

Fig. 20

Fig. 21

Fig. 22

Fig. 23

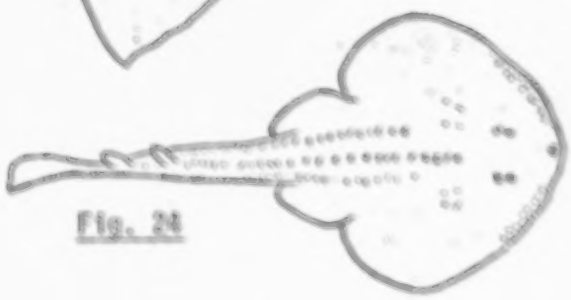


Fig. 24

Fig. 25

Fig. 26

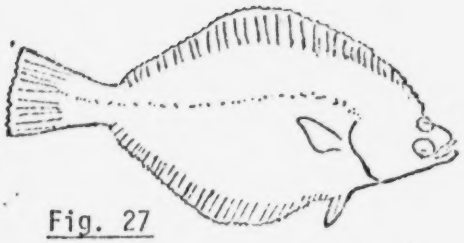


Fig. 27

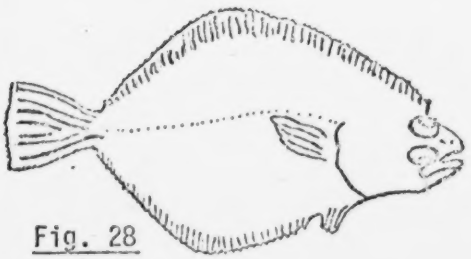


Fig. 28

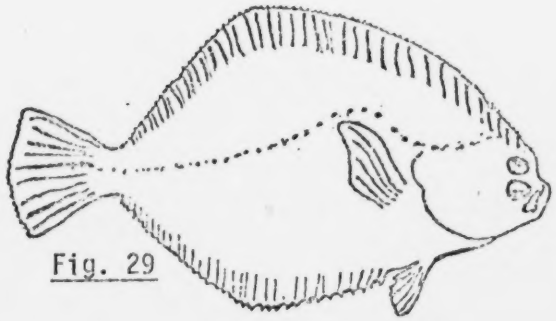


Fig. 29

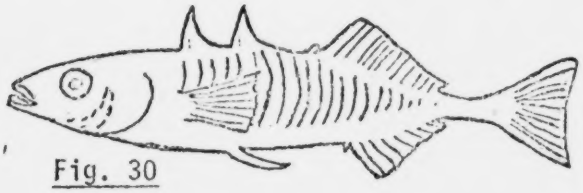


Fig. 30

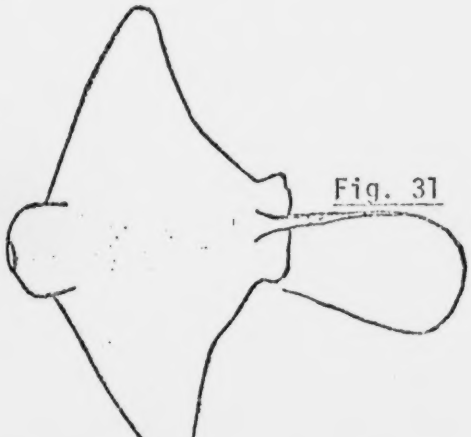


Fig. 31

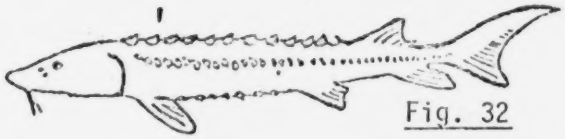


Fig. 32

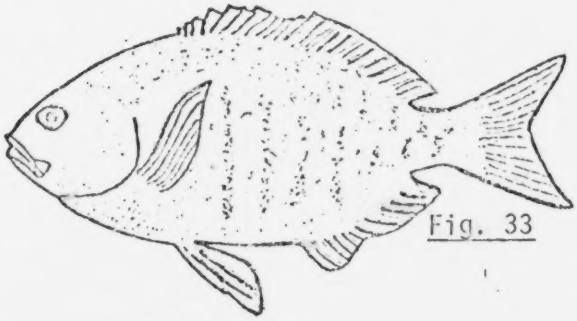
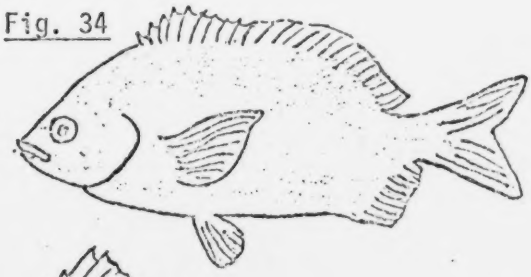


Fig. 33

Fig. 34



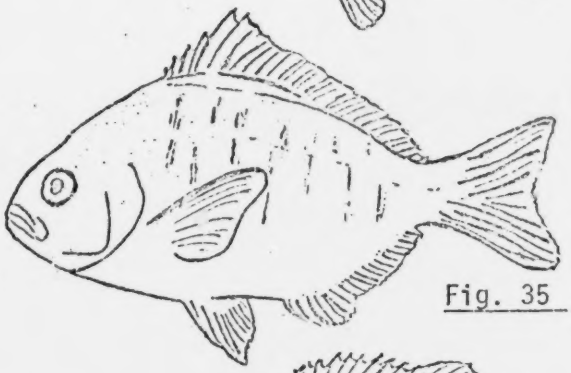
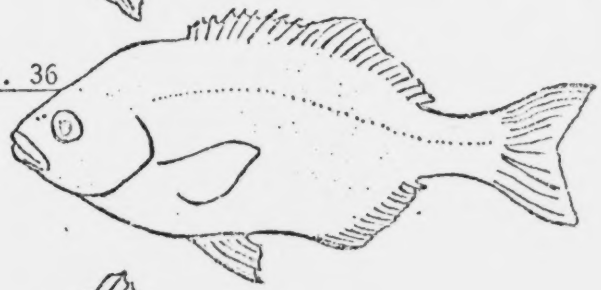


Fig. 35

Fig. 36



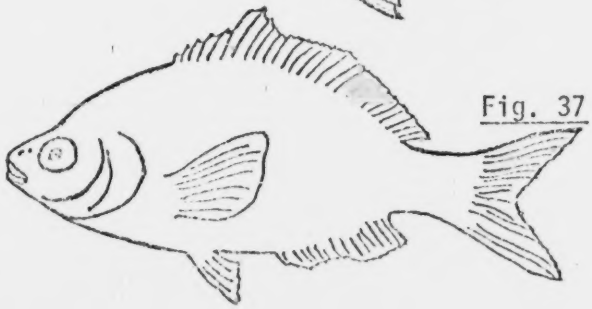


Fig. 37

Fig. 38

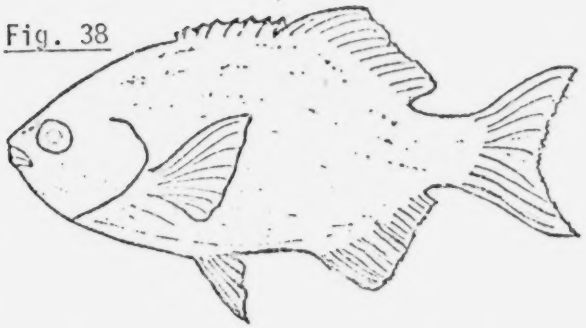


Fig. 39

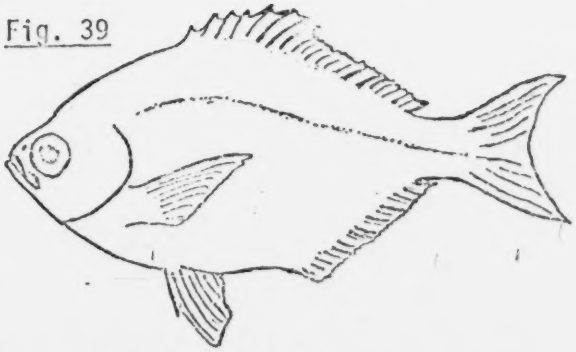


Fig. 40

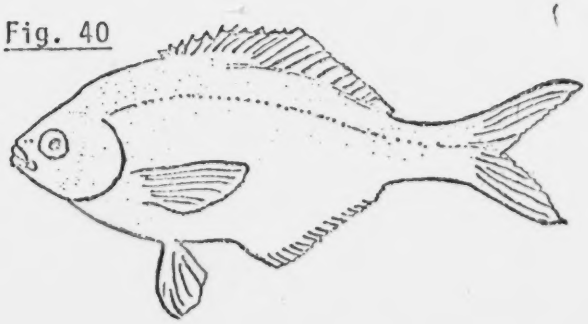


Fig. 41

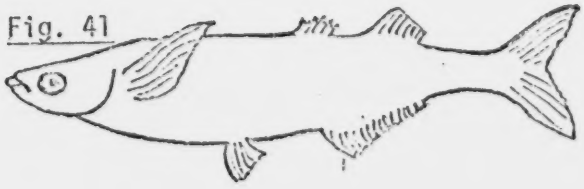


Fig. 42

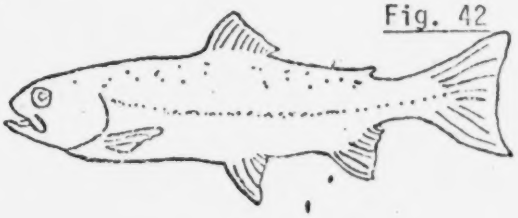


Fig. 43

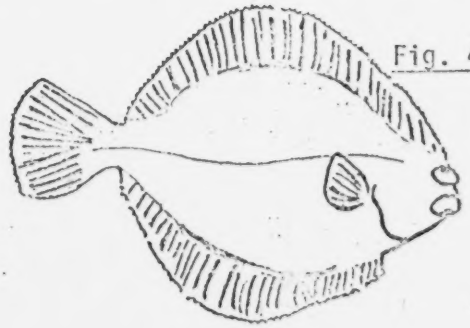


Fig. 44

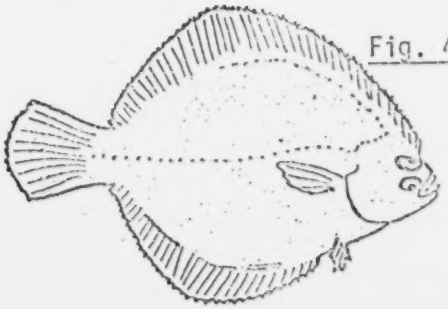
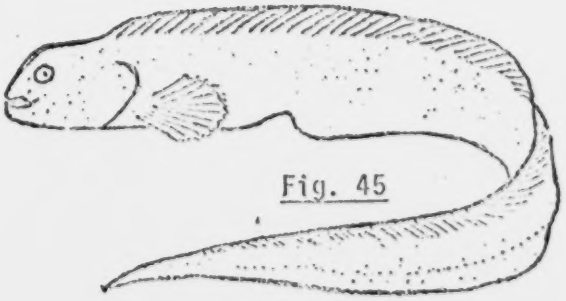


Fig. 45



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